

REMARKS

Claims 1-33, and 37-52 are pending in the application. Claims 1 and 14 are currently amended. Claims 34-36 have been cancelled. Applicants respectfully request for allowance of all the pending claims, based on following discussions.

Claim Objections

Claims 6 and 34 are objected to for one being a substantial duplicate of the other. In response, Applicants hereby cancel claim 34, and respectfully request that the objection be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP Patent Application No. 0919726 to Leyshon (hereinafter referred to as “Leyshon”) in view of US Patent No. 5,553,998 to Muhlhoff et al. (hereinafter referred to as “Muhlhoff”).

Independent claim is directed to a vacuum pump comprising a first pumping section, a second pumping section downstream from the first pumping section, a third pumping section downstream from the second pumping section, a first pump inlet through which fluid can enter the pump and pass through each of the pumping sections towards a pump outlet, and a second pump inlet through which fluid can enter the pump and pass through only the second and the third pumping sections towards the outlet, wherein the third pumping section comprises a helical groove formed in a stator thereof, at least one of the first and second pumping sections comprises a helical groove formed in a rotor thereof, and the first and second pumping sections are sized substantially the same in a radial direction, such that the first or second pumping section that has the

helical groove formed in the rotor thereof is able to increase a pumping capacity without a corresponding increase in size.

The added claim limitation “*the first and second pumping sections are sized substantially the same in a radial direction, such that the first or second pumping section that has the helical groove formed in the rotor thereof is able to increase a pumping capacity without a corresponding increase in size*” is supported by the specification. For example, FIG. 2 of the application illustrates a compound turbomolecular pump, in which the first pumping section 106 and the second pumping section 108 that has a helical groove formed in its rotor are sized substantially the same in a radial direction. Such feature enables the disclosed compound turbomolecular pump to improve its pumping capacity, without suffering from a corresponding increase in size. *See, the specification, page 9, lines 22-28.* This is advantageous over the conventional pump, because otherwise it would have been necessary for a person skilled in the art to enlarge the diameter of the middle pumping section of the conventional pump, in order to improve its pumping capacity. *See, the specification, page 2, lines 14-17.*

In rejecting claim 1, Examiner acknowledges that Leyshon does not teach “at least one of the first and second pumping sections comprises a helical groove formed in a rotor thereof,” but asserts that it would have been obvious for a person skilled in the art “to modify the apparatus of Leyshon by adding a helical groove formed in a rotor thereof after the first pumping section as taught in Muhlhoff et al. for the purposes of achieving further influence over the pressure behavior of the pump.” *See, the Final Office Action, paragraphs 2 and 7.*

Applicants respectfully submit that it would not have been obvious for a person skilled in the art to modify Leyshon as the Examiner suggests, because Leyshon does not offer any suggestion or motivation of such modification. Leyshon teaches a vacuum pump having a first pump stage 6 and a second pump stage 7 in fluid connection sequentially. *See, the abstract*. The first and second pump stages 6 and 7 are sized differently in order to adapt to different pressure conditions in which the stages operate, respectively. *See, the abstract*. The diameter D2 of the second pump stage 7 is larger than the diameter D1 of the first pump stage 6, due to their different pressure conditions. *See, the drawing*. By enlarging the size of the second pump stage 7, Leyshon's pump is able to adapt to different operational pressures at various pump stages, without the need for a helically grooved rotor. One advantage of the helically grooved rotor is the increased pumping capacity, while keeping the size of the middle pump stage small and in line with the size of other pump stages. Since size uniformity is not a concern of Leyshon, and Leyshon's design already addresses the issue of pressure differential between various pump stages, it offers no motivation or suggestion for a person skilled in the art to further modify the second pump stage 7 by shrinking its size and adding a helical groove to its rotor.

Applicants respectfully submit that the modification proposed by the Examiner is not obvious, because such modification changes the principle of operation of Leyshon. As discussed above, the principle of operation of Leyshon is sizing the first and second pump stages differently in order to accommodate different pressure conditions. For example, claim 1 of Leyshon provides "wherein the pump stages prior to the interstage are sized differently to these stages subsequent to the interstage such that the pump

overall suits the pressure requirements/pumping capacity of the different systems

attached to the first and second inlet respectively.” The modification proposed by the Examiner would do away the differential sizing that is so critical to Leyshon that it is a necessary limitation in its broadest claim 1. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959). Since the modification proposed by the Examiner changes the principle of operation of Leyshon, Applicants respectfully submit that such modification is not obvious.

As such, claim 1 is patentable over Leyshon and Muhlhoff under 35 USC 103(a). For the same reasons as discussed above, independent claim 14 is also patentable over Leyshon and Muhlhoff under section 103. Accordingly, claims 2-13, 15-33, and 37-52 that depend from claim 1 or 14 and include all the limitations recited therein are patentable over Leyshon and Muhlhoff, as well. It is noted that claims 34-36 have been cancelled.

CONCLUSION

Applicants have made an earnest attempt to place this application in an allowable form. In view of the foregoing remarks, it is respectfully submitted that the pending claims are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Examiner is therefore, respectfully requested to reconsider and withdraw the outstanding rejections.

Should Examiner deem that any further clarification is desirable, Examiner is invited to telephone the undersigned at the below listed telephone number.

Applicants do not believe that any additional fee is due, but as a precaution, the Commissioner is hereby authorized to charge any additional fee to deposit account number 50-4244.

Respectfully submitted,

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